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ON RECENT TRENDS IN ECONOMIC POVERTY IN FINLAND

Marja Riihelä
Risto Sullström
Matti Tuomala

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1 On Recent Trends in Economic Poverty in Finland

Marja Riihelä
Government Institute for Economic Research (VATT) , Helsinki, Finland
Email: marja.riihela@vatt.fi

Risto Sullström
Government Institute for Economic Research (VATT) , Helsinki, Finland
Email: risto.sullstrom@vatt.fi

Matti Tuomala
University of Tampere, Department of Economics, Finland
Email: ktmatuo@uta.fi

Abstract

We have examined recent trends in the economic or financial poverty in Finland using two data sources, the Income Distribution Statistics (IDS) and the Consumption Expenditure Survey (CES). We have drawn on the recent literature on poverty analysis to analyse a range of poverty measures. Scalar measures were complemented by an investigation of stochastic dominance in the analysis of poverty. As regards trends in poverty over time, the long-run perspective available from the CES indicates that from the early 1970s to the beginning of 1990s, the relative poverty rate has declined. The latter part of the 1990s was clearly different. We find that poverty rose over the period 1995-2001 for a very broad class of poverty measures and a wide range of poverty lines. Whilst the total numbers in poverty during the 1990s on these various definitions have risen markedly, the composition of the poor has also changed significantly. There is little doubt that unemployed households are the most vulnerable group of the population. It is obvious that this is not the whole story about poverty. Our study has been based on a series of snapshots of the income and consumption distributions. It makes possible to address questions such as how many people are poor and what sort of individuals are poor at a given point in time. They don't tell how long are people poor. An important area of future research is to look at the dynamic properties of the income and consumption distributions.

1.1 Introduction[1]

The existence of poverty in a developed economy like Finland is generally considered unbearable. A great majority of politicians from the left and right agree that poverty should be reduced, even though they disagree on what means should be used. Of course, there are those who are not concerned about poverty. There are also those who do not see much sense to talk about poverty in rich countries given more severe poverty problem in developing countries. Although we agree, that the problems in many African countries are much more pressing than here in Finland. But of course this does not mean that the issue of poverty in Finland is unimportant.

All components of public action may play a role in reducing poverty. For example, a macroeconomic policy aiming at full employment or labour market reform may increase employment and thus alleviate poverty. It is nevertheless that tax/transfer policy has a crucial role to play in treating the symptoms and also the causes of poverty.

Defining poverty is a difficult task, both for conceptual and technical reasons. Several approaches coexist, none of which is perfectly convincing. The first approach defines poverty in absolute terms: a household is poor if its consumption of certain essential goods falls below what is considered to be the minimum acceptable standard. This criterion in principle is multidimensional, but usually it is reduced to a single criterion of income: a household is classified as poor if its income does not allow it to purchase these minimum consumption levels. This is the approach used in the US. The European Union in turn has adopted a relative approach. A household is classified as poor if its income or consumption per consumption unit is below half (or 60 per cent) of the median (or sometimes mean). This definition thus implicitly considers that poverty is a relative notion, which

[1] We are grateful to Ilpo Suoniemi for very useful comments.

depends on the average income in society. Atkinson (1998) suggests ways in which these two approaches can be reconciled. Poverty is first defined on an absolute basis, as referring to households whose income is insufficient to cover physical basic needs. When this is achieved, poverty is then defined on a relative basis, referring in turn those households whose income does not allow them to function properly in their social environment. Hence we have a lexicographic ordering of poverty objectives. So absolute poverty comes first, but poverty within rich countries may plausible come next in our list of concerns.

Whether the measure adopted is absolute or relative, it is in most cases instantaneous: a family is poor in a given year if its income falls below the poverty line in that year. This family may in fact leave poverty the next year and not be poor over its life cycle. Instantaneous poverty indexes therefore should be complemented with measure of income mobility, which unfortunately are harder to come by (see Riihelä and Sullström, 2002).

Riihelä et al. (2001a) show that there has been a absolute fall in mean real disposable incomes for the unemployed households during the 1990s and that the redistributive effects of direct taxes and transfers has fallen during the latter part of the 1990s. Given this it is not surprising that relative poverty as a whole has increased over the 1990s in Finland (Riihelä et al., 2001b). Our previous paper has been concerned with income inequality. The present paper in turn explores the poverty trends in greater detail. In order to quantify the extent of poverty during 1971-2001 in Finland we have to choose the yardstick by which poverty should be measured. Are we, for example, concerned with poverty in terms of standard of living or of access to economic resources? It is commonly taken for granted that poverty is concerned with standard of living, typically measured by consumption expenditure. If income is taken as an indicator, then it is used economic resources as an indirect measure of standard of living. In this paper we use these both yardsticks. Second, having determined our yardstick, we have to de-

cide at what point on the income or expenditure scale is the poverty line to be set. Should it be incomes or expenditures below some fraction of the national average? Or incomes or expenditures close to minimum social security levels?

As one could expect, there is no single answer to the question of how many people in Finland are poor. In this paper we provide a range of estimates that vary according to the poverty line and method of measuring living standard that are used. We report results from two main sources, the Consumption Expenditure Survey (CES) and the Income Distribution Statistics (IDS) published by the Statistics Finland. The paper presents information on changes in the extent and composition of poverty, according to three aggregation procedures-one for each of the poverty measures computed: First, the headcount ratio (*H*), the most commonly used measure of poverty, is the fraction of income-receiving units which are below the poverty line. Second, the normalized poverty gap (*HI*) measuring the actual amount of income necessary to bring every household below the poverty line up to the poverty line. Third, the Foster-Greer-Thorbecke (*FGT*) measure with the poverty aversion parameter $a = 2$. It is a measure of the severity of poverty. In addition, scalar measures were complemented by an investigation of stochastic dominance in the analysis of poverty. Finally we utilize the decomposable property of *FGT*-measure.

1.2 Measuring poverty

But though poverty itself is a rather sophisticated and multi-facetted phenomenon, the economics of poverty essentially boils down to two fundamental questions when measuring poverty. First, we have to choose the yardstick by which poverty should be measured. Second, how the degree of poverty relative to a particular poverty line is measured and how this is aggregated across those who are deemed to be poor. A difference between the literature for developing and devel-

oped countries is that absolute considerations have dominated the former, while relative poverty has been more important in the latter. Some people, for example, Townsend (1985), commenting on Sen (1983), has taken the view that poverty is entirely relative.

A widely used method of defining poverty is to relate incomes or expenditures to some proportion of prevailing national average. National average can be defined as median or mean, the proportion used can vary, say from 40 to 60 per cent, but the general principle is that poverty is to be defined wholly by distance from national average income or expenditure. Statistics of this kind are now widely used in comparative studies in the EU context (see e.g. Danziger-Jäntti, 2000). The choice between the median and the mean is in part a matter of their relative statistical properties. It is also a question of the level of poverty line.

There is now a large literature on poverty measures stimulated by the article of Sen (1976). One of the main contribution of this article was to call into question the widespread use of headcount measure. The main objection to the headcount is that it gives no indication of the severity of poverty. Households may be close to the poverty line or far below. For this reason, the theoretical literature has developed alternatives to the head count. Atkinson (1998) provides, however, an interesting defence for the head-count. If a minimun income is a basic right, then the head-count measures the number deprived of that right. It is an either/or condition.

What are then other candidates? The first is the poverty gap, which is the sum (integral) of the shortfall from the poverty line. The poverty gap in turn may be criticized for evaluating equally all transfers to household below the poverty line irrespective of the seriousness of their poverty. This measure is insensitive to transfers between two households on the same side of the poverty line. Therefore, more sophisticated measures have been developed so that the transfer from a household close to the poverty line to a household far below the line has the ef-

fect of reducing measured poverty. For example there is a class of measures proposed by Foster, Greer and Thorbecke (1984). For useful surveys on poverty measures see e.g. Foster (1984), Atkinson (1987), Ravallion (1994) and Zheng (1999). In appendix 1 we shall focus on a few representative measures and those we used in our empirical analysis.

1.3 The data and results

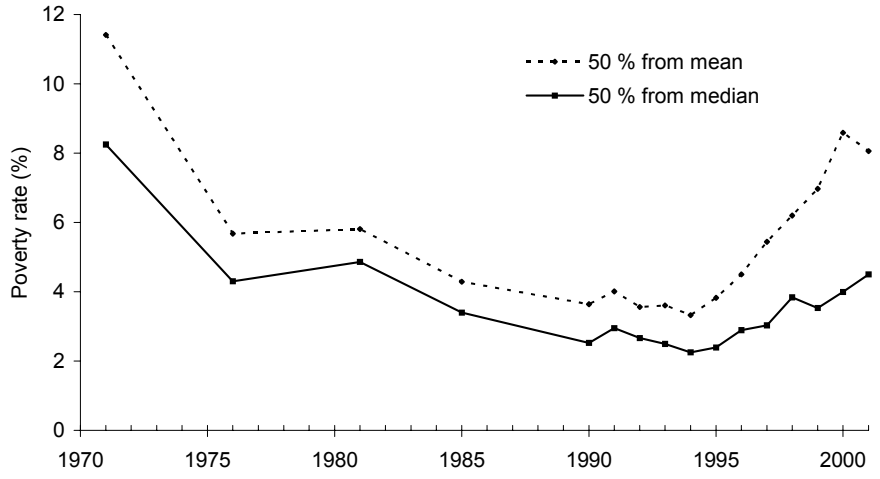
We use the Income Distribution Statistics (IDS) and the Consumption Expenditure Survey (CES)[2] published by the Statistics Finland. The IDS is a sample survey of around 9000-11000 households drawn from the private households in Finland. The IDS contains information on incomes, taxes and benefits together with various socio-economic characteristics of the Finnish households. Most of the information contained in the IDS has been collected from various administrative registers. Auxiliary information is collected through interviews. Indirect taxes, such as VAT and specific commodity taxes and the provision of public services are not included on our data. This may have important consequences, because indirect taxes and public services tend to be regressive (see for example Sullström and Riihelä, 1996 and Suoniemi, 1993). All types of income and consumption used in this study are calculated on annual basis. Households also differ in size and composition, and so a simple comparison of aggregate household consumption could be quite misleading about the well-being of individual members of a given household. The OECD equivalence scale is used in order to make comparable households with different size and composition. The OECD scale is calculated as follows. The first adult in each household has a weight of 1 and each additional adult a weight of 0.7. Each child under 18 years old gets a weight

[2] See Suoniemi and Sullström (1995) for a detailed exposition of this data set.

of 0.5. We also make comparisons with the so called modified OECD-scale, shortly MOECD. In this scale the first adult in each household has a weight of 1 and each additional adult a weight of 0.5. For the children, aged 0 - 13, the weight is 0.3. Members aged over 13 are adults. The new EU standard for poverty is determined by 60 per cents from median income (see Atkinson 2000).

Figure 1 shows the trends in the relative poverty between 1971 and 2001 when a poverty line is set equal to 50 per cent of either median or mean income of the year concerned. The picture reveals that relative poverty declined until the mid 1990s. It rose, thereafter, sharply during the latter part of the 1990s. The relative income poverty rate defined in terms of having low income relative to a contemporaneous standard, a poverty line set at 50 per cent of median (mean) income, was in 1971 8.3 per cent (11.4), in 1995 2.4 per cent (3.8) and in 2001 4.5 per cent (8.1).

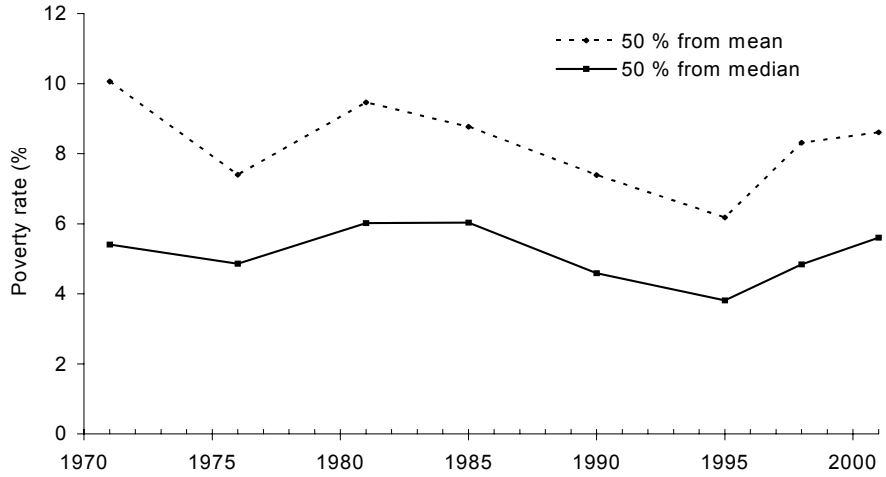
Figure 1 Numbers and percentage of the population below 50 per cent of mean and median income, 1971-2001



Figures 1 and 2 show that over the period from 1971 to 2001 there were actually more people living below the spending based poverty lines than below in-

come based ones. Figures 1 and 2 also show clearly the seemingly perverse effect that the recession had on purely relative poverty measures. In the recession of the early 1990s, the poverty head count actually fell, whether it is income or consumption that is used in assessment. This shows that the middle and high incomes must have been worse hit by the recession than the low incomes. Similarly, in the latter part of the 1990s, a period of rapid economic growth, large gains for those at the top along with smaller gain for other can result in a very rapid rise in head count poverty.

Figure 2 Numbers and percentage of the population below 50 per cent of mean and median consumption, 1971-2001

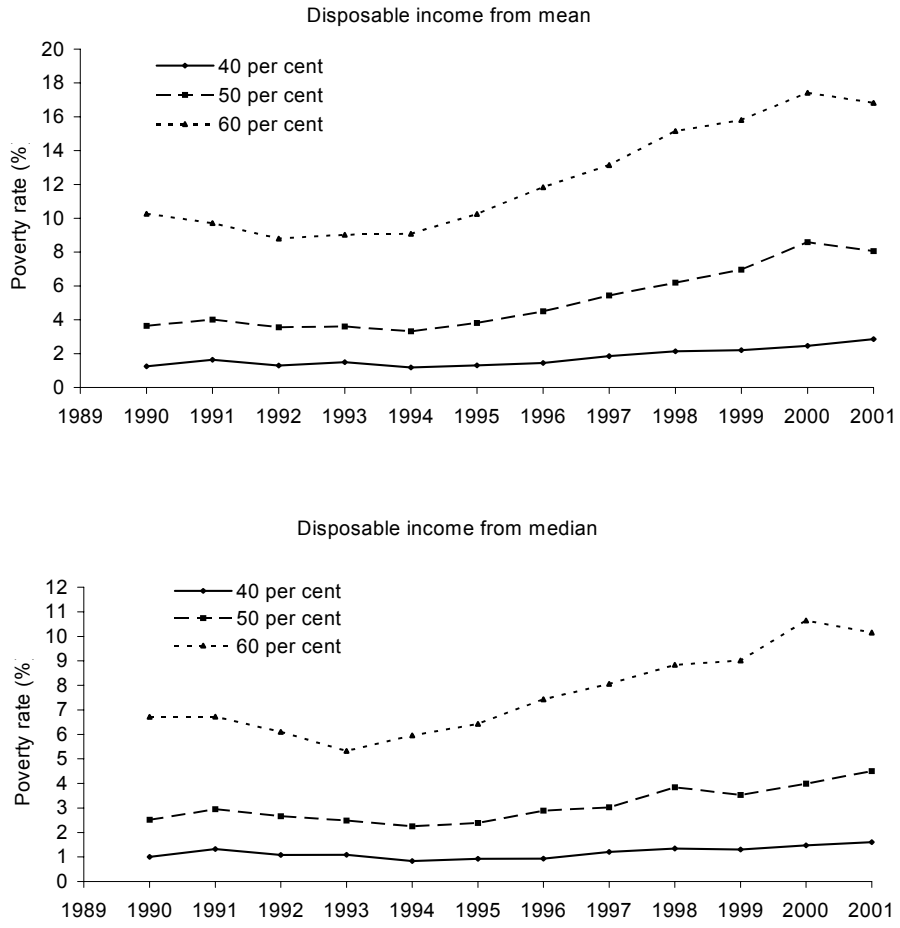


Correspondingly Figure 2 shows the trends in the relative poverty of consumption.[3] We can see that in this case relative poverty declined from year 1985 to the mid 1990s. However, the trends of income and consumption poverty are in the direction with the same tendency in the latter part of 1990s.

[3] The length of the bookkeeping period in consumption (in CES) was a month in 1971 and 1976 and after that two weeks. Income variables in the samples were always the length of one year.

In Figure 3 we show the proportion of the population below 40 per cent, 50 per cent, and 60 per cent of mean disposable income in each year during the 1990s. What is striking about Figure 3 is that whether the poverty line is set at 40 per

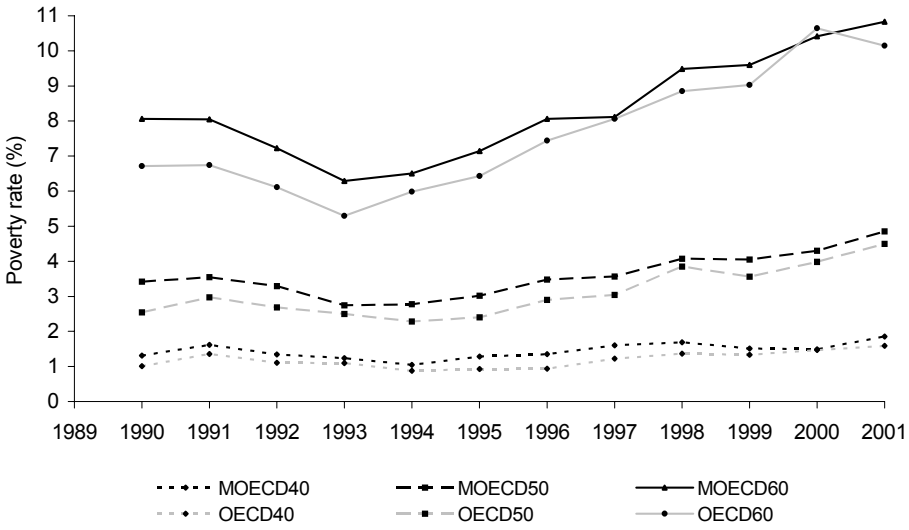
Figure 3 Percentage of the population below 40, 50 and 60 per cent of mean and median income 1990-2001



cent, 50 per cent or 60 per cent of national average income, the numbers below the line have risen dramatically since the beginning of the 1990s. Using the 50

per cent threshold, the proportions have risen from 3.7 per cent in 1990 to 8.1 per cent of the population in 2001. These charts do, however, demonstrate that the choice of poverty line can still have important implications to the precise description of trends as well as levels. The change in equivalence scales affects not only the level of poverty, but also the composition of poverty. The level-effect of adopting the modified OECD scale (MOECD) is shown in Figure 4. (see also Tables A.2.1-A.2.3).

Figure 4 Poverty rates by OECD- and MOECD-scales modified incomes



One problem with the poverty measure based on a proportion of the mean is that the mean may be skewed upwards by some very high incomes at the very top of the distribution. This may be a reason why the poverty measures based on a proportion of the mean deviates from those based on the proportion of the median income during the latter part of the period considered. It is also reasonable to argue that what is happening at the top of distribution should not affect the measurement of poverty. A poverty measure less sensitive to such effects is one based on a proportion of the median, the point in the middle of the distribution.

Table 1 gives our estimates of income poverty in Finland for various poverty measures and for different poverty lines (40 per cent, 50 per cent and 60 per cent of median income). All three measures and three poverty lines indicate a significant increase in income poverty between 1990 and 2001. We find that the head-

Table 1 Aggregate poverty measures in 1990, 1995 and 2001, median (%)

Income poverty

	1990			1995			2001		
	40 %	50 %	60 %	40 %	50 %	60 %	40 %	50 %	60 %
H	1.01	2.54	6.72	0.93	2.40	6.43	1.60	4.50	10.1
HI	0.27	0.54	1.17	0.21	0.47	1.06	0.42	0.90	1.95
P_2	0.14	0.23	0.41	0.09	0.18	0.35	0.19	0.35	0.67

Consumption poverty

	1990			1994-1996[a]			2001		
	40 %	50 %	60 %	40 %	50 %	60 %	40 %	50 %	60 %
H	1.37	4.59	10.02	1.09	3.81	8.96	1.76	5.60	11.93
HI	0.23	0.74	1.80	0.16	0.60	1.54	0.31	0.94	2.22
P_2	0.06	0.20	0.52	0.05	0.16	0.42	0.09	0.27	0.66

[a] The weighted years 1994, 1995 and 1996.

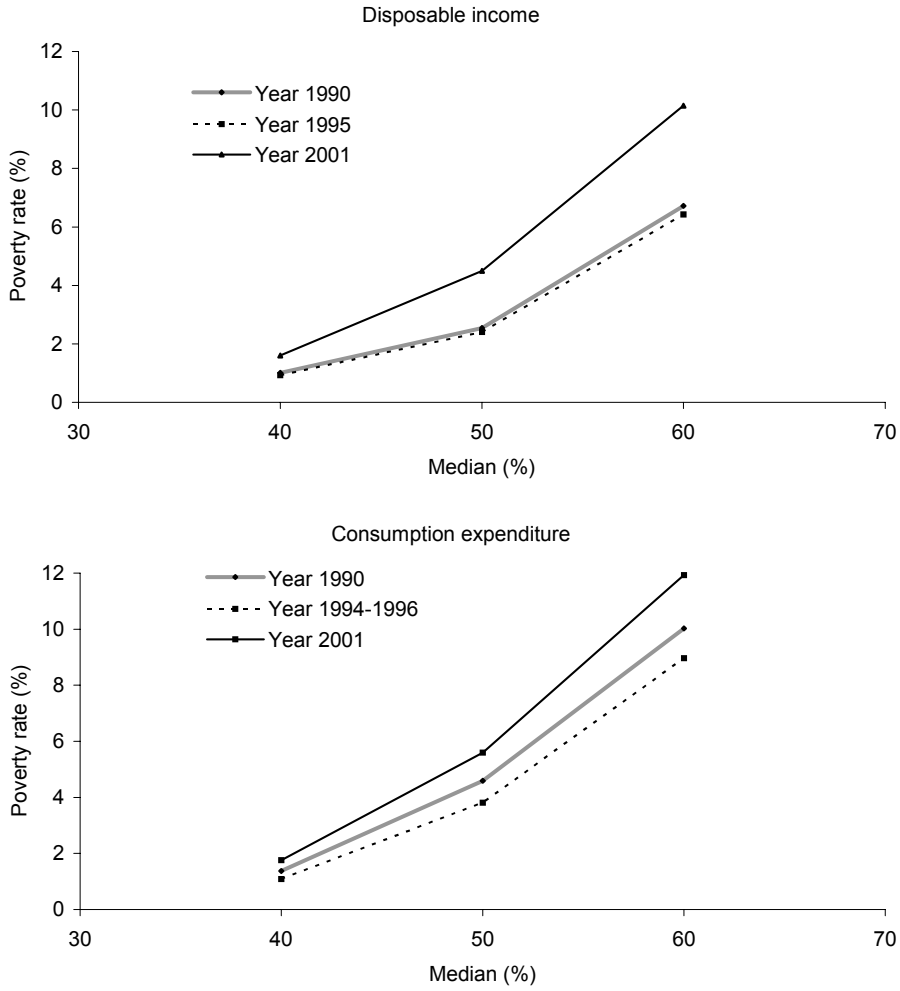
count index of poverty increased from 2.5 per cent to 4.5 per cent by 2001 poverty line being 50 per cent of median and from 6.7 to 10.1 per cent poverty line being 60 per cent of median. Thus the rise in headcount index indicates that there were more poor people in 2001 than there had been in the beginning of 1999s. The poverty gap measure in turn indicates that the aggregate income shortfall of the poor increased 66.7 per cent (poverty line being 50 per cent of median). What is striking about table 1 is that whether the poverty line is set at 40, 50 or 60 per cent of national median income, not only the number below the line have risen dramatically since the beginning of the 1990s but poverty has also become more severe. In addition, the aggregate poverty gap grew by proportionately

slightly less than the head count index (66.7 per cent versus 77.2 per cent poverty line being 50 per cent of median). Finally, the 52.2 per cent (63.4 per cent) rise in P_2 (poverty line being 50 per cent (60 per cent) of median) suggests that incomes among the poor were also distributed more unequally.

Are our quantitative results on the change in poverty over this period robust to the choice of an indicator of the standard of living? An alternative yardstick is to use expenditure as the measure of standard of living. Spending as a measure of standard of living may better capture the longer-term aspects of households' well-being. From table 1 we see that the number of households with spending below 40, 50 and 60 per cent of the median expenditure in 1990, 1994-1996 and 2001 was more than the number whose disposable incomes were below 40, 50 and 60 per cent of the median. In other words over the whole of the 1990s, there were actually more people living below the spending consumption-based poverty lines than below income-based ones. The rise in consumption based P_2 measure during the latter part of the 1990s tells that consumption expenditures among the poor were also distributed more unequally in the end of the 1990s than in the beginning of the decade. Both the income and consumption expenditure measures showed a similar rate of growth over the 1990s.

Are the quantitative results robust to the choice of poverty line and measure? The application of the dominance test is illustrated in Figure 5 where the range of possible poverty lines is taken from 40 to 60 per cent of the median. The curve for 2001 is everywhere above that for 1990. Thus we can agree on the direction of the change – economic (income and consumption expenditure) poverty has increased – even if we do not agree where in that range the poverty line is located. In other words the first-order dominance conditions holds, and so one can conclude that all well-behaved poverty measures and all possible poverty lines will show an unambiguous increase in aggregate poverty between two dates.

Figure 5 First-Order Dominance (*FOD*) from median



1.4 Who are the poor?

It may also be of interest to explore the socio-economic status composition of those in the poorest group. For this purpose we can use the decomposable property of P_a. In other words we can decompose aggregate poverty into its constitu-

ent parts. First, we consider the population split into 9 socio-economic subgroups in Table 2. Using the Head count measure, H, we look at those with below 40, 50

Table 2 Subgroup poverty contributions and head count measure (*H*, %)

Income poverty

Population group[a]	1990			1995			2001		
	Poverty line			Poverty line			Poverty line		
	40 %	50 %	60 %	40 %	50 %	60 %	40 %	50 %	60 %
Farmers	13.35	11.07	8.76	8.21	5.53	5.60	6.07	5.96	5.70
Entrepreneurs	24.42	15.82	11.71	22.15	19.62	13.85	24.06	18.13	11.37
White collars	0.58	1.51	2.22	0.00	0.00	1.03	2.25	0.87	2.24
Blue collars	3.03	4.15	6.63	4.18	6.47	6.03	1.51	5.56	8.56
Workers	5.85	14.72	19.82	3.80	3.90	9.26	0.71	7.75	14.14
Students	25.74	19.27	10.51	19.66	21.27	13.78	34.45	24.22	16.96
Pensioners	14.31	21.71	30.89	3.01	5.01	11.48	4.90	6.80	12.54
Unemployed	6.05	4.09	3.86	31.53	33.29	30.93	12.96	23.69	22.48
Others	6.68	7.66	5.60	7.46	4.82	8.04	13.10	7.02	6.03
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Consumption poverty

Population group[a]	1990			1994-1996			2001		
	Poverty line			Poverty line			Poverty line		
	40 %	50 %	60 %	40 %	50 %	60 %	40 %	50 %	60 %
Farmers	7.03	6.00	9.12	15.24	8.70	7.55	1.51	2.81	4.58
Entrepreneurs	0.67	1.95	3.37	2.79	2.06	2.97	5.43	3.60	3.70
White collars	0.18	0.53	2.34	0.00	1.30	3.41	2.20	1.98	2.72
Blue collars	3.90	5.75	8.33	6.78	3.56	7.47	1.24	6.66	7.84
Workers	17.89	25.01	25.04	8.56	16.71	16.92	19.33	22.54	24.92
Students	2.08	1.51	2.32	3.52	2.20	3.40	6.50	4.24	4.65
Pensioners	61.23	53.16	44.69	43.37	40.25	36.75	34.58	35.53	35.25
Unemployed	3.85	1.77	1.25	17.93	23.10	19.17	23.70	17.96	12.69
Others	3.16	4.33	3.53	1.82	2.12	2.36	5.52	4.68	3.65
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

[a] We call shortly Employers and own account workers in agriculture as Farmers, Other entrepreneurs and own-account workers as Entrepreneurs, Upper-level salaried employees as White collars and Lower-level salaried employees as Blue collars.

and 60 per cent of median income and consumption in years 1990, 1995 (1994-1996) and 2001. The changes between these dates are the most interesting in terms of composition. Using consumption based measure the two most over-represented subgroups in 1990 were pensioners and workers. Over the period since 1990, the biggest change was the major deterioration in the position of unemployed households. The contribution of unemployed to income and consumption poverty rose markedly from 1990 to 2001.

The incidence of poverty is also on a rather different set of people under the consumption measure. Using spending as the living standard measure leads to many more pensioners and workers being classified as poor. Amongst pensioners this is because pensioners' spending tends to be low compared with the average. On the other hand, there are a considerable number of low-income non-pensioner households whose spending is relatively high. There has also been a slightly declining trend in income and consumption poverty amongst pensioners over the period. Table 2 does appear to indicate that entrepreneurs and students are two groups most at risk of poverty, measured in terms of income. Using income as the living standard may lead misleading conclusions with those groups. Particularly, this is problematic with students because the IDS and CES data sets don't provide information on the extent of income and other support students received from their parents.

The breakdown by socio-economic group is only one of numerous possible way of decomposing the population to reveal its constituent parts and their contribution to the overall picture of poverty. If we divide the population into 10-year age-groups, divided according to the age of the head of the households, we can see very little variations in the level of contribution to aggregate poverty (see Appendix 2, Table A.2.1). We find that from 1990 to 2001 an increase in the contribution to aggregate poverty is remarkable only among those households with the head in the age group 45-54. The high rate of unemployment among this

age group is the main reason for this trend. Similar analysis dividing the population according to family types will be presented in Appendix 2 in Table A.2.2. Perhaps surprisingly we see relatively little variation in the contribution to aggregate poverty of different family types from 1990 to 2001.

The advantage of using a range of lines is that the poverty measure obtained from single line may be sensitive to precise positioning of that line. Figures A1 - A3 in Appendix 3 illustrate this point. Figures show the distribution of disposable income for each of our nine socio-economic groups together with a vertical line indicating half mean income. For some groups, such as farmers, entrepreneurs and white collars, the precise location of the poverty line will have relatively little effect on the numbers within the group appearing in poverty. The reason is simply that the incomes of these groups are relatively evenly spread and no particular poverty line has any significance for them. As we can see from Figures A1 - A3 this is not the case for group such as unemployed whose incomes are highly concentrated peaking around a level, which is about half mean income. Thus a slightly lower poverty line would take many unemployed households out of measured poverty, whereas a slightly higher line would bring many in.

1.5 Conclusions

We have examined recent trends in the poverty in Finland using two data sources, the IDS and the CES. We have drawn on the recent literature on poverty analysis to analyse a range of poverty measures, using dominance conditions to rank the distributions of living standards. As regards trends in poverty over time, the long-run perspective available from the CES indicates that from the early 1970s to the beginning of 1990s, the relative poverty rate has declined. The latter part of the 1990s was clearly different. We find that poverty rose over the period 1995-2001 for a very broad class of poverty measures and a wide range of pov-

erty lines. Whilst the total numbers in poverty during the 1990-2001 on these various definitions have risen markedly, the composition of the poor has also changed significantly. There is little doubt that unemployed households are the most vulnerable group of the population.

It is obvious that this is not the whole story about poverty. Our study has been based on a series of snapshots of the income and consumption distributions. It makes possible to address questions such as how many people are poor and what sort of individuals are poor at a given point in time. They don't tell how long are people poor. An important area of future research is to look at the dynamic properties of the income and consumption distributions.

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Appendixes

Appendix 1:

In the discrete case, let there be *n* income receiving units and let the income unit i be denoted by y_i.[4] The incomes (or expenditures) are arranged in ascending order and poverty line is *z*. In the continuous case, let the density and cumulative density of *y* be given respectively by *f(y)* and *F(y)*; and let y lie between y_{min} and y_{max}.

The most commonly used measure of poverty is the so-called head count ratio, the fraction of income-receiving units which are below the poverty line. Denoting this by *H*, it follows that in the discrete case and continuous case, respectively,

$$H = \frac{1}{n}\sum_{i=1}^{n} 1(y_i \le z), \qquad (1)$$

where 1(.) is an indicator function that is 1 if its argument is true and 0 otherwise. For example, if 10 per cent of the population are deemed to be poor, then *H* = 0.10. While identifying the number of the poor, it ignores how poor the poor are, and therefore has the absurd property that it remains unchanged when a previously poor unit becomes even poorer. For example, if we take one Euro from the poorest unit and give it to the richest unit, the head count ratio would remain unchanged. This is one reason why the head count measure used as a measure of poverty has been under severe attack (see e.g. Sen 1976, 1979, and Watts 1968). For certain sorts of poverty comparisons, such as assessing overall progress in reducing poverty, head count ratio may be quite satisfactory. Atkinson (1987, 1998) was among the few scholars who saw that the attack on the head count is not fully justified. He argued that 'minimum income may be seen as a basic right,

[4] In the weighted case 1/n is replaced by $w_i / \sum_{i=1}^{n} w_i$, in which the weight is w_i.

in which case the head count may be quite acceptable as a measure of the number deprived of that right'.

To overcome drawbacks of the head count measure, the income gap ratio is suggested as a supplement. Denoting this by *I*, $I = 1 - m^z/z$, where m^z denotes the mean consumption of the poor. This gives the average of the poverty gaps $(z - y)$ as a fraction of the poverty line. To take account of the numbers of the poor in the sense that if the poor units were exactly duplication, *I* would remain unchanged, it is suggested that the product of *HI* would be more satisfactory.

$$HI = \frac{1}{n}\sum_{i=1}^{n}(1 - y_i / z)\mathrm{I}(y_i \le z). \qquad (2)$$

Thus *HI* is sensitive to both the numbers of the poor and to how poor they are. *HI* has an interesting interpretation, which makes it very attractive in policy applications. Namely *HI* measures the actual amount of income necessary to bring every household below the poverty line up to the poverty line. The drawback of the *HI* measure is that it is insensitive to redistribution of income within the poor household. If one Euro of income was taken from the poorest unit and given to a unit which is richer but still well below the poverty line the *HI* measure would remain unchanged. Sen (1976) has proposed a better measure of the severity of poverty, given by

$$S = H\left(1 - (1 - G_p)\frac{\mu_p}{z}\right), \qquad (3)$$

where μ_p is the mean of y among the poor, and G_p is the Gini coefficient of inequality among the poor. If there is no inequality amongst the poor then $S = HI$. The *S*-measure in turn is not additive. In other words S is not equal to the population weighted sum of poverty counts in the various sub-groups of society. A measure of the severity of poverty which is decomposable is the Foster, Greer

and Thorbecke (1984) (hereafter FGT). The FGT class of measure can be written as

$$P_a = \frac{1}{n}\sum_{i=1}^{n}\left[1 - y_i / z\right]^a 1(y_i \le z)\,. \tag{4}$$

The parameter $a \ge 0$ measures how sensitive the index is to transfers between the poor units. For $a > 1$, transfer from low to high incomes will increase poverty. When $a = 2$, this measure can be expressed as

$$P_a = H\left(I^2 + (1-I)^2 C_p^2\right)1(y_i \le z)\,, \tag{5}$$

where C_p is the coefficient of variation among the poor. This class of measure has proven very useful for policy analyses. It already contains indices (*H*) and (*HI*) as special cases

$$P(a=0) = P_0 = H \tag{6}$$

$$P(a=1) = P_1 = HI. \tag{7}$$

It is clearly the decomposability of P_a which has lead to its widespread application in practice.[5] Divide the population into m subgroups, mutually exclusive and exhaustive, with group j having a fraction x_j of the population, $\sum_{j=1}^{m} x_j = 1$. Denote the poverty index in subgroup j by $P_{j,a}$, i.e.

$$P_a = \sum_{j=1}^{m} x_j P_{j,a}\,, \tag{8}$$

thus, overall poverty can be written as a weighted sum of subgroup poverty indices.

Although major advances have been made in the search for better cardinal measures of poverty, there is still widespread concern over arbitrariness in the choice of the poverty measure and the poverty line. Fortunately, for many ap-

[5] E.g. in analysing the targeting of poverty alleviation programs see Kanbur (1987), Besley and Kanbur (1988) and Kanbur, Keen and Tuomala (1994).

plications, all that we need is the ordinal ranking of distribution. As Sen (1979) noted that "one may be forced to use more than one criterion because of non-uniformity of accepted standard and look at the partial ordering generated by the criteria taken together" (p. 280). An important strand of research in poverty analysis (Atkinson, 1987, Foster-Shorrocks, 1988) drawing on and developing results from the theory of stochastic dominance has shown when one can make reasonable ordinal poverty comparisons.

If ordinal comparisons suffice, we need not confine ourselves to a particular poverty line and poverty measure. If the class of poverty measures satisfies certain conditions, we can apply the first-order dominance test. Then it can be shown that poverty will unambiguously increase (decrease) between two dates, say 1990 and 2001 in Finland, if the cumulative distribution for the latter date lies nowhere below (above) that for the former date, up to z_{max}. Comparing distributions of 1990 and 2001 if F(2001,z) is everywhere above F(1990,z) up to z_{max}, then the head count index must also be higher for 2001, no matter what the poverty line. When the first-order dominance is inconclusive, we can further restrict the range of admissible poverty measures (excluding H) then we can use a second order dominance condition. In other words we restrict attention to measures which reflect the depth of poverty such as HI and P_2. When a second-order dominance, in turn, is inconclusive we can exclude H and HI then a third order dominance condition can be tested.

Appendix 2:

Table A.2.1 Poverty profile by the age of the household head

Population group	Year	Population share by household type (%)	OECD-scale, 50 per cent of median (1)	(2)	(3)	(4)	Modified scale, 60 per cent of median (1)	(2)	(3)	(4)
Under 25 years	1990	5.3	11.6	24.2	2.8	1.1	21.8	14.3	6.3	2.7
	1995	4.6	19.2	36.9	4.2	1.5	39.0	25.2	10.3	4.1
	2001	5.3	23.1	27.1	7.1	3.4	42.9	20.9	13.0	6.2
25-34- years	1990	22.6	2.2	19.4	0.4	0.1	4.8	13.3	0.9	0.3
	1995	20.7	2.2	19.2	0.3	0.1	6.0	17.4	0.9	0.3
	2001	17.0	6.2	23.4	1.0	0.3	11.0	17.3	2.0	0.6
35-44- years	1990	31.9	1.8	22.3	0.4	0.2	3.4	13.6	0.8	0.3
	1995	28.0	2.0	23.7	0.4	0.2	5.1	20.1	10.0	0.3
	2001	26.9	4.1	24.3	0.7	0.2	8.7	21.6	1.4	0.4
45-54- years	1990	16.9	1.4	9.6	0.3	0.1	4.1	8.6	0.8	0.3
	1995	22.2	1.4	12.9	0.3	0.1	4.2	13.0	0.8	0.3
	2001	23.7	3.1	16.5	0.4	0.1	7.4	16.3	1.4	0.4
55-64- years	1990	10.8	2.8	11.8	0.6	0.2	10.7	14.3	1.9	0.6
	1995	10.6	1.1	5.1	0.3	0.1	5.7	8.4	1.0	0.3
	2001	12.6	1.8	5.1	0.2	0.1	7.1	8.2	1.1	0.3
65-74- years	1990	7.5	2.4	6.9	0.5	0.3	18.0	16.7	2.5	0.7
	1995	8.5	0.5	1.8	0.1	0.0	6.3	7.5	0.6	0.1
	2001	8.2	0.9	1.7	0.3	0.2	9.0	6.8	1.1	0.3
over 74 years	1990	4.9	2.9	5.7	0.5	0.2	31.1	19.1	4.7	1.1
	1995	5.4	0.2	0.4	0.0	0.0	11.0	8.2	1.0	0.2
	2001	6.4	1.3	1.8	0.3	0.2	15.3	9.0	1.8	0.5
Total	1990	100	2.5	100	0.5	0.2	8.1	100	1.5	0.5
	1995	100	2.4	100	0.5	0.2	7.1	100	1.3	0.4
	2001	100	4.5	100	0.9	0.3	10.8	100	2.1	0.7

(1) *H*, (2) Contribution to aggregate poverty (%), (3) *HI*, (4) P_2.

Table A.2.2 Poverty profile by the stage of life cycle of the household

Population group	Year	Population share by-household type (%)	OECD-scale, 50 per cent of median				Modified scale, 60 per cent of median			
			(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
One-person households	1990	9.6	7.3	27.6	1.8	0.8	21.7	25.9	5.4	2.2
(under 65 years)	1995	10.9	8.4	38.4	1.8	0.6	24.3	37.2	5.8	2.2
	2001	11.7	10.5	27.3	2.7	1.3	28.0	30.2	7.4	3.1
Single-parent	1990	7.2	4.4	12.6	0.6	0.2	8.8	7.9	1.6	0.5
households	1995	7.9	2.4	7.7	0.5	0.2	7.6	8.4	1.2	0.4
(under 65 years)	2001	7.6	6.3	10.5	1.1	0.3	18.4	12.9	2.9	0.8
Childless couples	1990	15.2	1.7	10.2	0.5	0.2	4.7	9.0	1.0	0.4
(under 65 years)	1995	17.1	2.1	15.3	0.4	0.1	5.7	13.6	1.1	0.3
	2001	19.2	2.2	9.5	0.5	0.2	5.6	10.0	1.2	0.4
Couples with children	1990	52.4	1.7	35.4	0.4	0.1	3.2	20.6	0.6	0.2
	1995	49.1	1.7	35.7	0.3	0.1	3.7	25.4	0.6	0.2
	2001	45.5	4.7	47.5	0.7	0.2	7.6	31.9	1.3	0.4
One-person, single-	1990	11.2	2.3	9.9	0.4	0.2	23.9	33.3	3.4	0.9
parent and childless	1995	12.0	0.2	1.0	0.0	0.0	7.5	12.7	0.7	0.1
couples over 64 years	2001	13.1	0.9	2.5	0.2	0.2	10.9	13.2	1.3	0.4
Others	1990	4.2	2.6	4.3	0.4	0.1	6.2	3.3	1.0	0.3
	1995	2.9	1.6	1.9	0.3	0.1	6.5	2.6	0.9	0.3
	2001	2.9	4.1	2.6	1.2	0.8	6.8	1.8	1.8	1.0
Total	1990	100	2.5	100	0.5	0.2	8.1	100	1.5	0.5
	1995	100	2.4	100	0.5	0.2	7.1	100	1.3	0.4
	2001	100	4.5	100	0.9	0.3	10.8	100	2.1	0.7

(1) *H*, (2) Contribution to aggregate poverty (%), (3) *HI*, (4) P_2.

Table A.2.3 Poverty profile by the socioeconomic status of the household head

Population group	Year	Population share by household type (%)	OECD-scale 50 per cent of median				Modified scale 60 Pper cent of median			
			(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Employers and own-account workers in agriculture	1990	5.7	4.9	11.1	1.3	0.6	8.2	5.8	2.1	0.9
	1995	4.6	2.9	5.5	0.6	0.2	6.5	4.2	1.2	0.4
	2001	3.6	7.5	6.0	1.4	0.5	12.0	4.0	2.6	0.9
Other entrepreneurs and own-account workers	1990	7.4	5.4	15.8	1.7	0.8	8.7	8.1	2.5	1.2
	1995	6.5	7.3	19.6	1.5	0.6	13.4	12.1	3.0	1.2
	2001	6.8	11.9	18.1	2.8	1.2	16.5	10.4	4.5	1.8
Upper-level salaried employees	1990	16.2	0.2	1.5	0.1	0.0	0.7	1.5	0.1	0.1
	1995	15.3	0.0	0.0	0.0	0.0	0.2	0.5	0.0	0.0
	2001	18.7	0.2	0.9	0.1	0.1	0.7	1.2	0.2	0.1
Lower-level salaried employees	1990	19.4	0.5	4.1	0.1	0.0	2.1	5.1	0.3	0.1
	1995	18.8	0.8	6.4	0.1	0.0	1.7	4.5	0.3	0.1
	2001	19.0	1.3	5.6	0.2	0.1	3.4	5.9	0.5	0.1
Workers	1990	30.1	1.2	14.7	0.2	0.1	3.0	11.3	0.5	0.1
	1995	23.3	0.4	3.9	0.1	0.0	2.1	6.7	0.2	0.0
	2001	23.6	1.5	7.8	0.2	0.0	4.3	9.4	0.5	0.1
Students	1990	1.2	39.7	19.3	9.2	3.6	63.3	9.7	20.9	9.3
	1995	1.9	26.5	21.3	5.4	2.1	54.4	14.7	14.9	5.8
	2001	2.6	41.6	24.2	10.4	4.5	72.5	17.5	20.4	9.1
Pensioners	1990	18.4	3.0	21.7	0.5	0.2	22.5	51.2	3.3	0.9
	1995	20.6	0.6	5.1	0.1	0.0	7.6	22.1	0.8	0.2
	2001	20.2	1.5	6.8	0.3	0.1	12.2	22.7	1.5	0.4
Unemployed	1990	0.6	16.6	4.1	4.4	1.7	43.3	3.4	10.6	4.0
	1995	7.5	10.7	33.3	2.1	0.8	28.7	30.0	5.8	2.0
	2001	4.4	24.3	23.7	3.3	1.0	58.5	23.6	11.2	3.2
Others	1990	0.9	22.5	7.7	4.7	2.1	37.7	4.0	9.2	4.1
	1995	1.5	7.7	4.8	2.5	1.4	25.1	5.2	4.6	2.2
	2001	1.1	28.1	7.0	8.0	3.2	50.0	5.2	12.9	5.5
Total	1990	100	2.5	100	0.5	0.2	8.1	100	1.5	0.5
	1995	100	2.4	100	0.5	0.2	7.1	100	1.3	0.4
	2001	100	4.5	100	0.9	0.3	10.8	100	2.1	0.7

(1) *H*, (2) Contribution to aggregate poverty (%), (3) *HI*, (4) P_2.

Appendix 3:

Figure A1 Distribution of disposable income by socio-economic groups in 1990

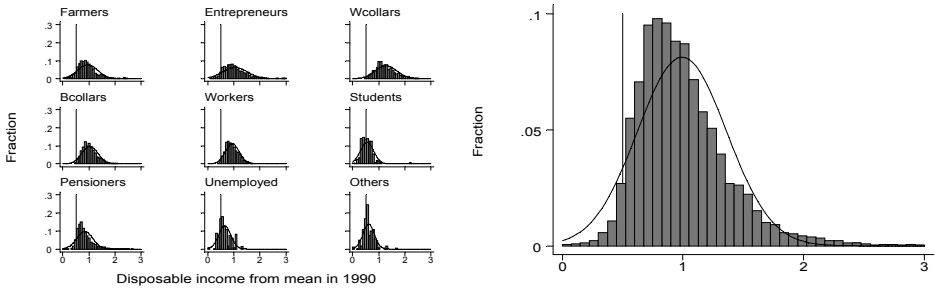


Figure A2 Distribution of disposable income by socio-economic groups in 1995

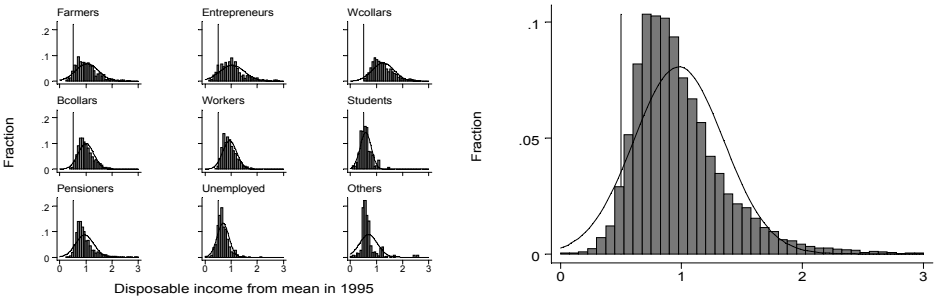
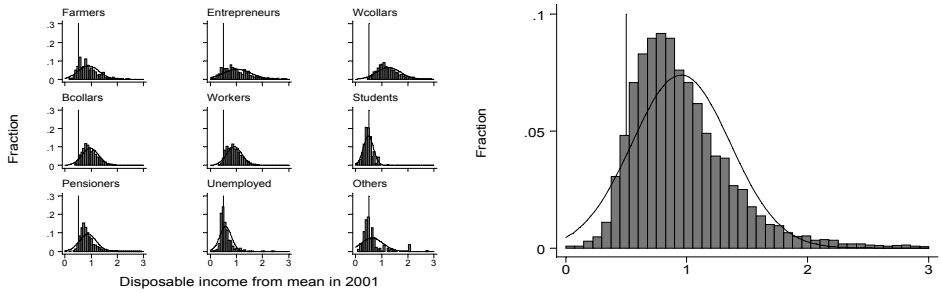


Figure A3 Distribution of disposable income by socio-economic groups in 2001



Appendix 4:

Table A.4.1 Poverty rates of *H, HI, P_2* from mean and median by using OECD-scale in 1971-2001

Poverty rate %	Poverty measure	1971	1976	1981	1985	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
From median																	
40	H	3.67	1.80	2.38	1.59	1.01	1.35	1.10	1.10	0.88	0.93	0.94	1.22	1.36	1.33	1.47	1.60
40	HI	1.07	0.43	0.76	0.51	0.27	0.36	0.29	0.33	0.23	0.21	0.23	0.29	0.33	0.33	0.34	0.42
40	P_2	0.50	0.24	0.49	0.37	0.14	0.17	0.14	0.16	0.12	0.09	0.10	0.13	0.15	0.15	0.15	0.19
50	H	8.25	4.36	4.93	3.47	2.54	2.97	2.69	2.50	2.29	2.40	2.90	3.04	3.85	3.56	3.99	4.50
50	HI	2.07	0.93	1.32	0.87	0.54	0.69	0.57	0.60	0.47	0.47	0.54	0.63	0.73	0.71	0.75	0.90
50	P_2	0.87	0.40	0.68	0.48	0.23	0.29	0.24	0.26	0.20	0.18	0.20	0.25	0.28	0.28	0.28	0.35
60	H	13.6	10.6	9.82	8.32	6.72	6.74	6.11	5.29	5.99	6.43	7.44	8.06	8.85	9.03	10.6	10.1
60	HI	3.52	1.99	2.30	1.65	1.17	1.35	1.17	1.13	1.03	1.06	1.26	1.40	1.60	1.58	1.80	1.95
60	P_2	1.46	0.71	1.02	0.71	0.41	0.51	0.43	0.44	0.36	0.35	0.40	0.47	0.54	0.53	0.57	0.67
From mean																	
40	H	6.24	2.28	2.74	1.86	1.27	1.66	1.32	1.51	1.22	1.31	1.45	1.85	2.16	2.24	2.47	2.86
40	HI	1.48	0.52	0.84	0.57	0.34	0.44	0.36	0.41	0.29	0.29	0.32	0.41	0.47	0.50	0.54	0.62
40	P_2	0.66	0.27	0.51	0.39	0.16	0.20	0.17	0.19	0.14	0.12	0.13	0.18	0.20	0.21	0.22	0.26
50	H	11.4	5.74	5.87	4.35	3.67	4.02	3.58	3.62	3.36	3.82	4.51	5.44	6.19	7.00	8.59	8.06
50	HI	2.92	1.15	1.50	1.02	0.72	0.87	0.75	0.80	0.66	0.70	0.82	0.97	1.18	1.26	1.42	1.52
50	P_2	1.21	0.46	0.74	0.53	0.28	0.36	0.30	0.33	0.25	0.25	0.28	0.35	0.41	0.44	0.47	0.54
60	H	19.8	13.0	11.8	10.3	10.2	9.71	8.81	9.03	9.05	10.2	11.8	13.1	15.1	15.8	17.4	16.8
60	HI	4.98	2.51	2.67	2.03	1.68	1.79	1.60	1.62	1.54	1.72	2.01	2.33	2.70	2.89	3.32	3.27
60	P_2	2.04	0.86	1.14	0.82	0.55	0.64	0.55	0.59	0.50	0.53	0.61	0.73	0.86	0.92	1.03	1.09
Population (1000)		4476	4676	4727	4833	4974	5000	5022	5015	5035	5053	5063	5077	5086	5097	5105	5120

Table A.4.2 Poverty rates of *H*, *HI*, P_2 from mean and median by using MOECD-scale in 1990-2001

Poverty rate %	Poverty measure	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
From median													
40	H	1.31	1.62	1.34	1.24	1.05	1.28	1.35	1.60	1.69	1.51	1.49	1.86
40	HI	0.34	0.43	0.36	0.37	0.28	0.28	0.31	0.35	0.41	0.40	0.38	0.48
40	P_2	0.16	0.20	0.17	0.18	0.14	0.11	0.13	0.15	0.18	0.19	0.17	0.23
50	H	3.42	3.55	3.29	2.74	2.77	3.02	3.48	3.56	4.07	4.05	4.30	4.85
50	HI	0.72	0.85	0.72	0.69	0.59	0.62	0.70	0.77	0.86	0.83	0.83	1.00
50	P_2	0.29	0.36	0.30	0.30	0.24	0.23	0.26	0.29	0.34	0.33	0.32	0.40
60	H	8.06	8.05	7.23	6.29	6.51	7.14	8.06	8.11	9.48	9.60	10.41	10.83
60	HI	1.53	1.62	1.44	1.28	1.22	1.31	1.50	1.56	1.79	1.78	1.86	2.11
60	P_2	0.53	0.62	0.53	0.50	0.43	0.45	0.51	0.55	0.63	0.62	0.62	0.74
From mean													
40	H	1.67	2.08	1.68	1.74	1.53	1.68	1.90	2.19	2.50	2.48	2.71	2.93
40	HI	0.40	0.51	0.42	0.46	0.35	0.37	0.42	0.49	0.57	0.58	0.58	0.68
40	P_2	0.18	0.23	0.19	0.21	0.16	0.15	0.17	0.20	0.24	0.25	0.24	0.30
50	H	4.49	4.52	4.12	3.83	3.84	4.38	4.91	5.46	6.49	7.03	8.03	8.39
50	HI	0.90	1.02	0.89	0.89	0.78	0.86	0.97	1.11	1.29	1.36	1.48	1.59
50	P_2	0.34	0.41	0.35	0.38	0.30	0.31	0.34	0.41	0.47	0.49	0.51	0.58
60	H	10.79	10.01	9.52	9.16	9.71	11.00	11.87	13.41	15.29	16.29	17.87	17.13
60	HI	1.96	2.01	1.84	1.77	1.72	1.92	2.14	2.42	2.82	3.03	3.39	3.40
60	P_2	0.66	0.74	0.65	0.66	0.58	0.63	0.70	0.81	0.94	0.99	1.07	1.15
Population (1000)		4974	5000	5022	5015	5035	5053	5063	5077	5086	5097	5105	5120